Silver Lake Low Impact Development (LID) Stormwater Designs

Water Resource Management Policies and Successful Strategies

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Low Impact Development

An innovative, ecosystem-based approach to land development and stormwater management

Goal -Mimic the pre-development site hydrology

Low Impact Development Center

www.lowimpactdevelopment.org

Primary Goal of LID

Design each development site to protect, or restore, the natural hydrology of the site so that the overall integrity of the watershed is protected. This is done by creating a “hydrologically” functional landscape.

Basic LID Principles

- Conserve natural areas
- Minimize development impacts
- Maintain site runoff rate
- Use integrated stormwater management practices
- Implement pollution prevention, proper maintenance and public education programs

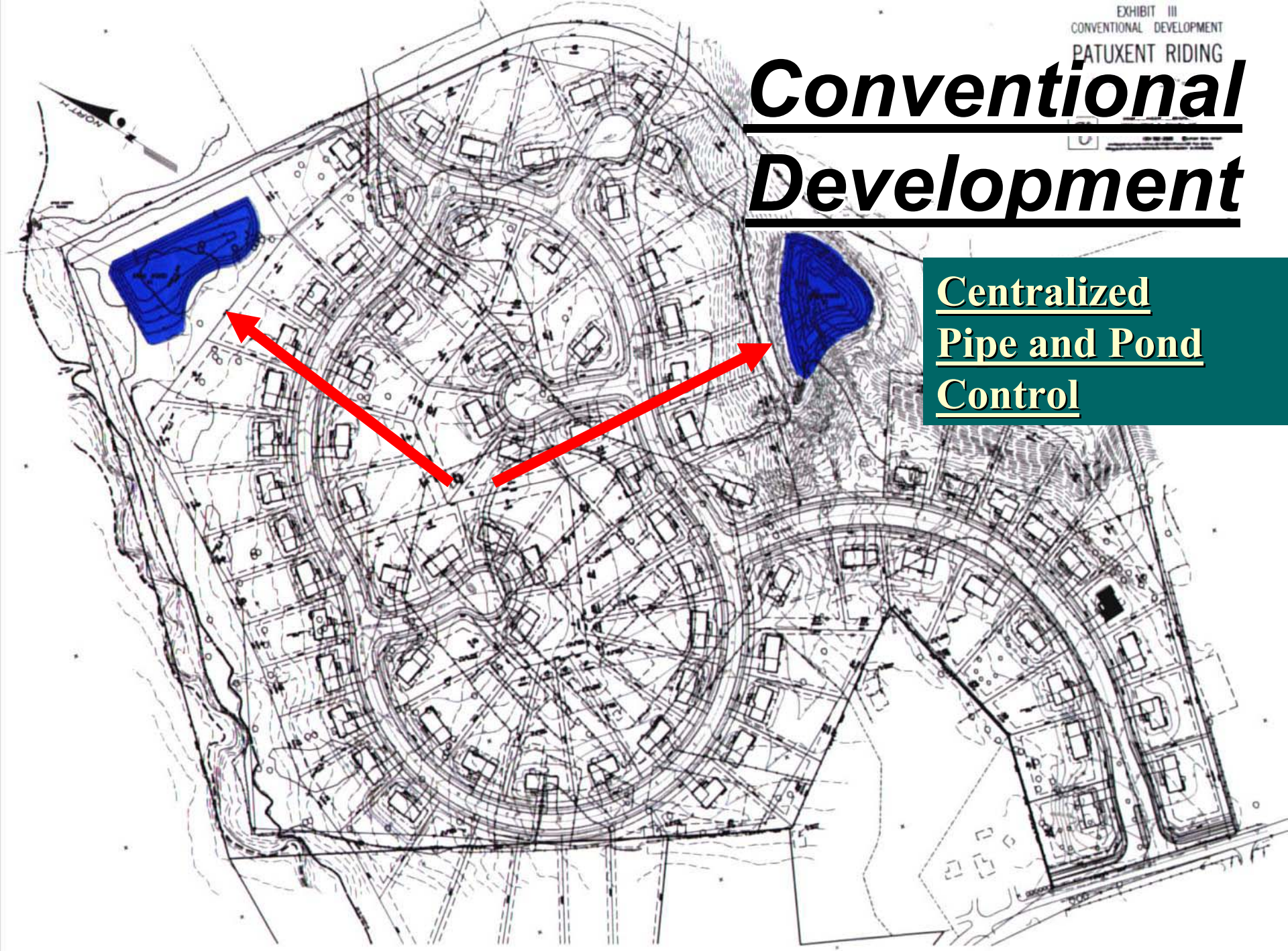
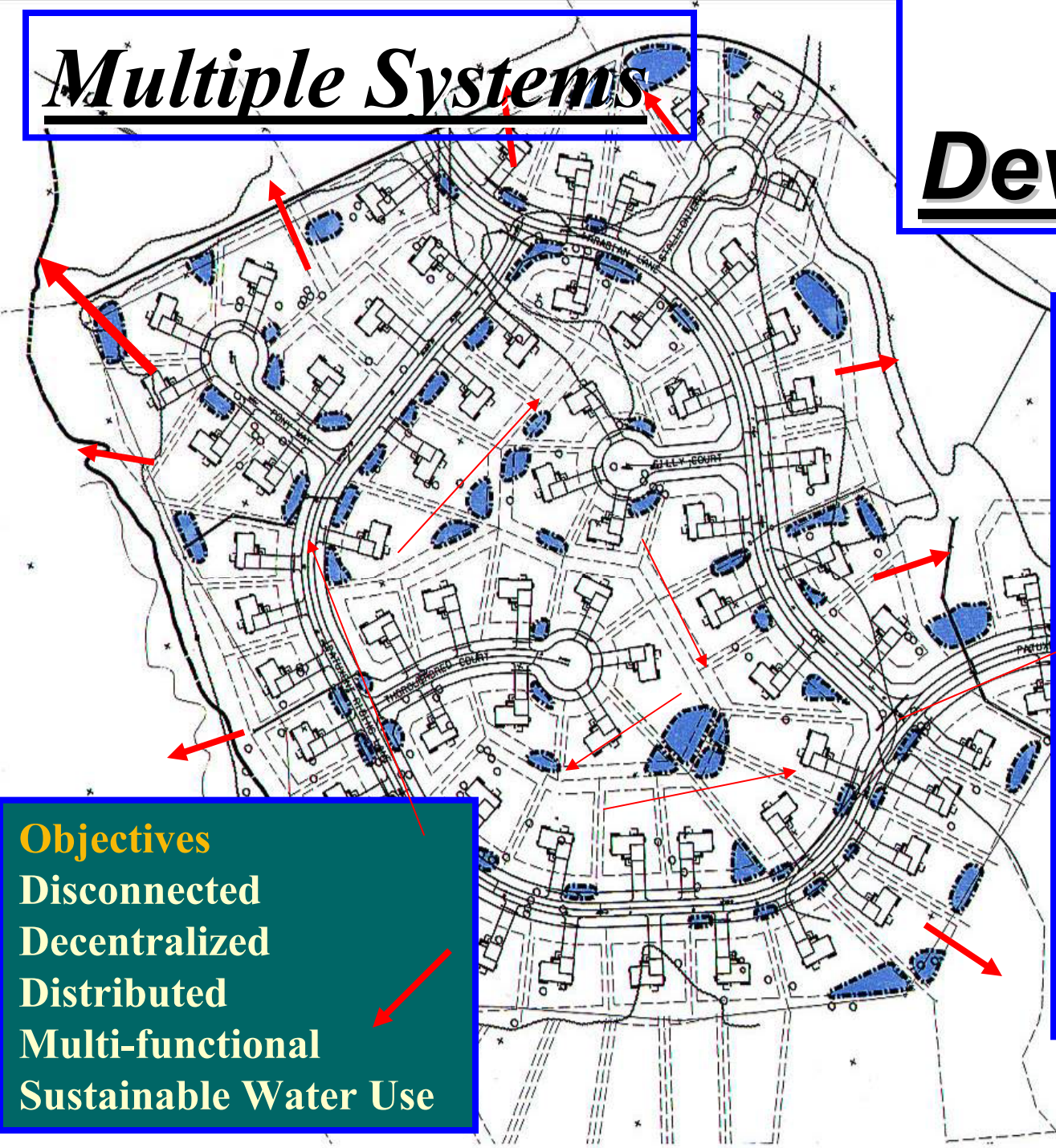


EXHIBIT III
CONVENTIONAL DEVELOPMENT
PATUXENT RIDING
Conventional Development
Centralized Pipe and Pond Control

Multiple Systems

LID Development



Techniques

- Conservation
- Minimization
- Soil Amendments
- Open Drainage
- Rain Gardens/Bioretention
- Rain Barrels
- Pollution Prevention

Objectives

Disconnected
Decentralized
Distributed
Multi-functional
Sustainable Water Use

Conventional vs. LID Approach to Stormwater

- Conventional
  - Collect
  - Convey
  - Discharge
- LID Approach
  - Reduce volume
  - Minimize impacts
  - Distributed controls
  - Treatment trains
  - Infiltration
  - Hybrid systems
  - Mimic the predevelopment hydrology

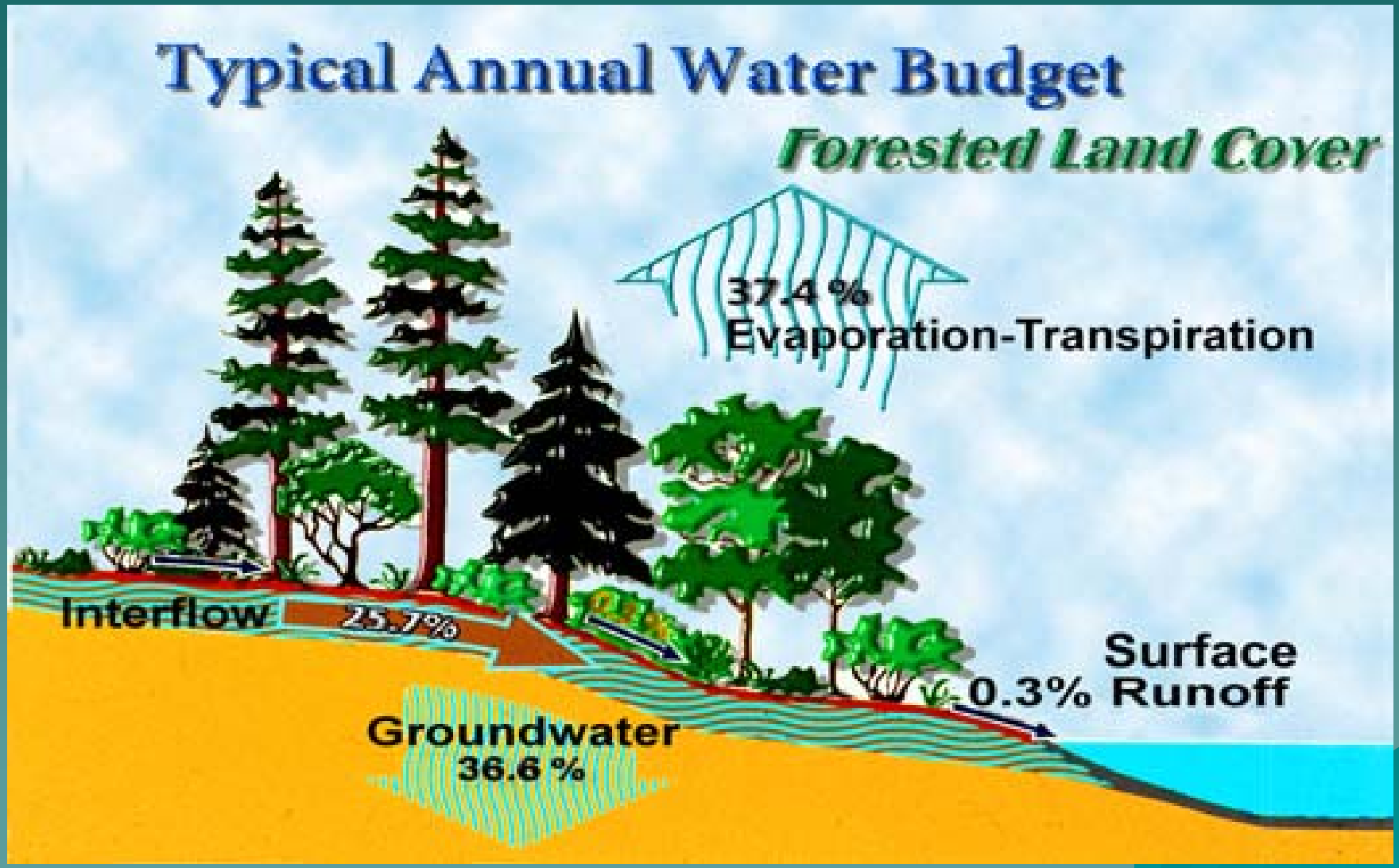
Conventional

Low Impact

Conventional

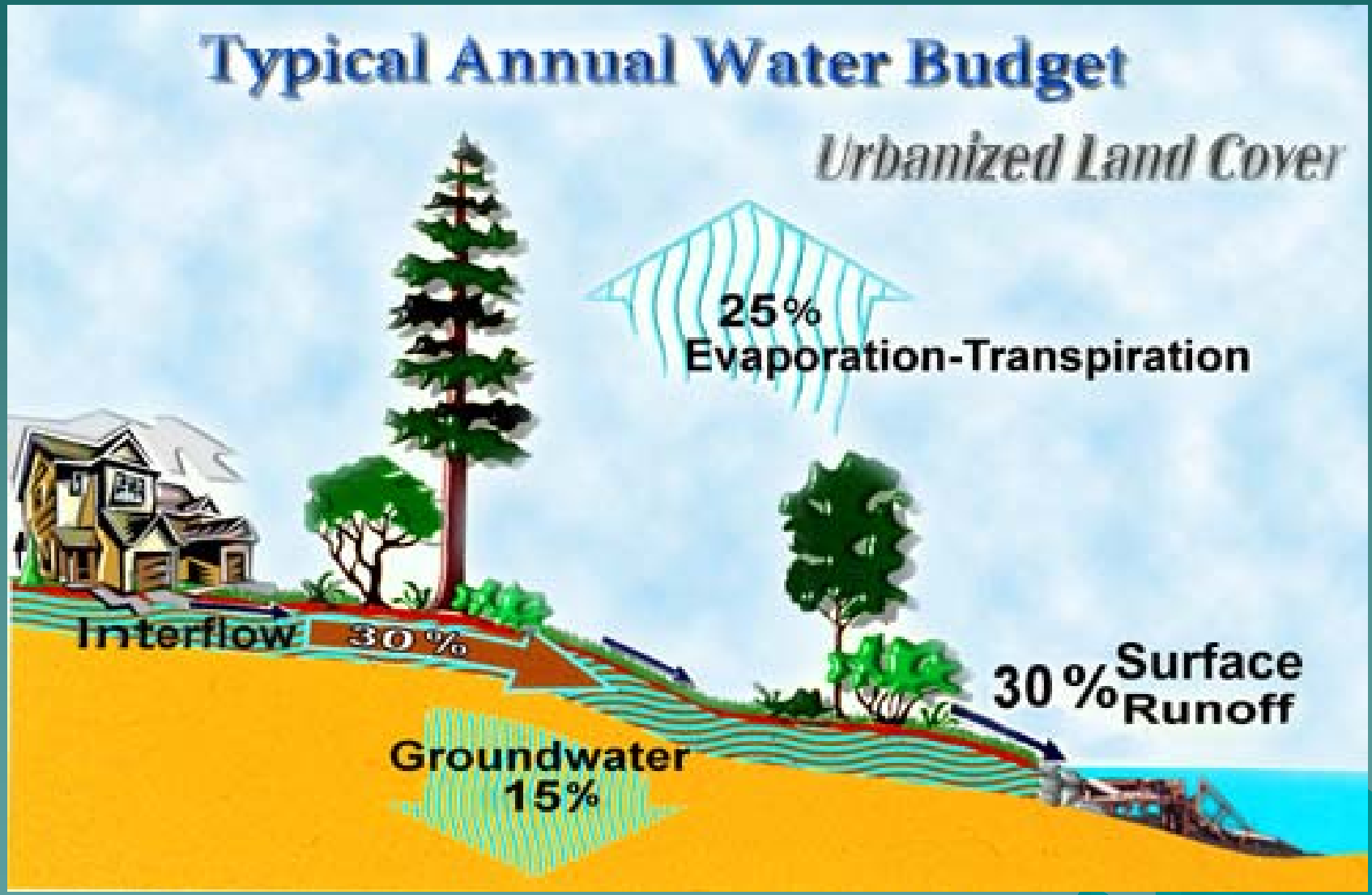
Functional Landscape Design

Natural Conditions



Courtesy May, U of W

Developed Conditions



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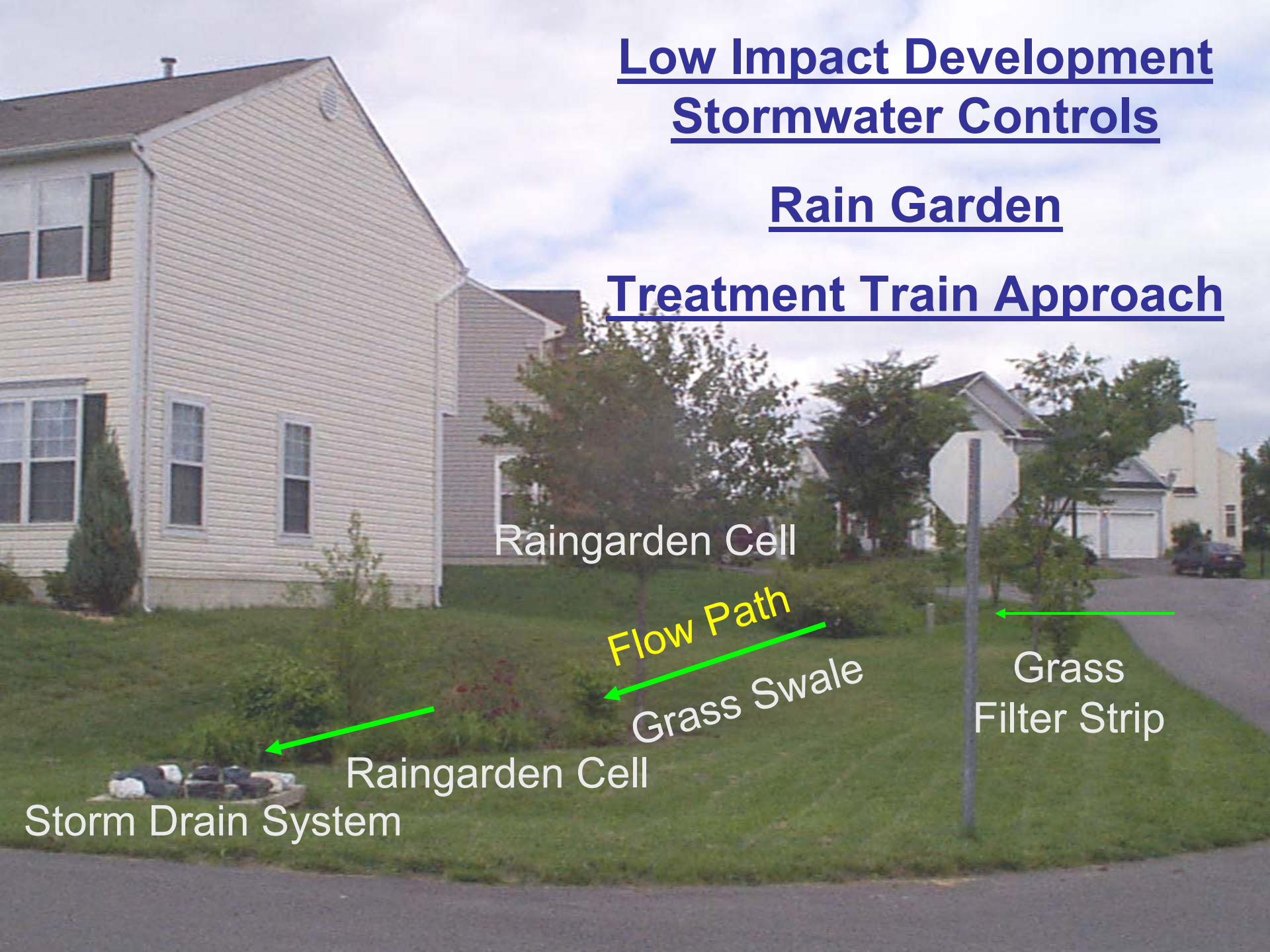
Low Impact Development Stormwater Controls


Low Impact Development
Stormwater Controls
Rain Garden
Treatment Train Approach
Raingarden Cell
Flow Path
Grass Swale
Grass
Filter Strip
Raingarden Cell
Storm Drain System

Integrated Management Practices

- Small-scale stormwater controls
- Distributed throughout site
- Maintain flow patterns, filter pollutants and re-create or maintain hydrology

Silver Lake Watershed Facts

Watershed area: 132 acres

Pond area: 28.5 acres

Watershed:Lake ratio = 4.6:1

Targeted Watershed Grant from the USEPA to MADCR for the restoration of the Ipswich River Watershed

Matching funds provided by the Town of Wilmington

Silver Lake Overview

- 28.5 Acre Kettlehole Lake
- Persistent Bacteria Problems
- Five LID Retrofit Areas


Area 4
Area 5
Silver Lake
Wilmington, MA
Area 1
Area 3
Area 2

Area #1 Northwest Edge of Town Beach


Sand and sediment deposits from parking area
31 10:06 AM

Area #2 Southeastern End of Town Beach

Area #1 and #2 Water Quality Swales

Current Condition of Water Quality Swales with Turf Reinforced Mat (TRM) at Silver Lake Town Beach

Area #1 and #2 Improvements

Typical Water Quality Swale with Turf Reinforced Mat (TRM)


Area #3 Parking Lot Improvements
Wide Range of Options:
Porous Pavers
Porous Asphalt
GravelPave™
Bioretention cells
31 10:06AM

Area #3 Parking Lot Improvements (cont.)

Wide Range of Options:

- Porous Pavers
- Porous Asphalt
- GravelPave™
- Bioretention cells

Area #3 Parking Lot Improvements (cont.)

UNI-Eco Stone ™ Porous Pavers

Area #5: Parking Lot Improvements (cont.)

Porous Asphalt

Pictures and video from www.thcahill.com


PARKING LOT CLOSED AT 10 PM


28 1:53PM

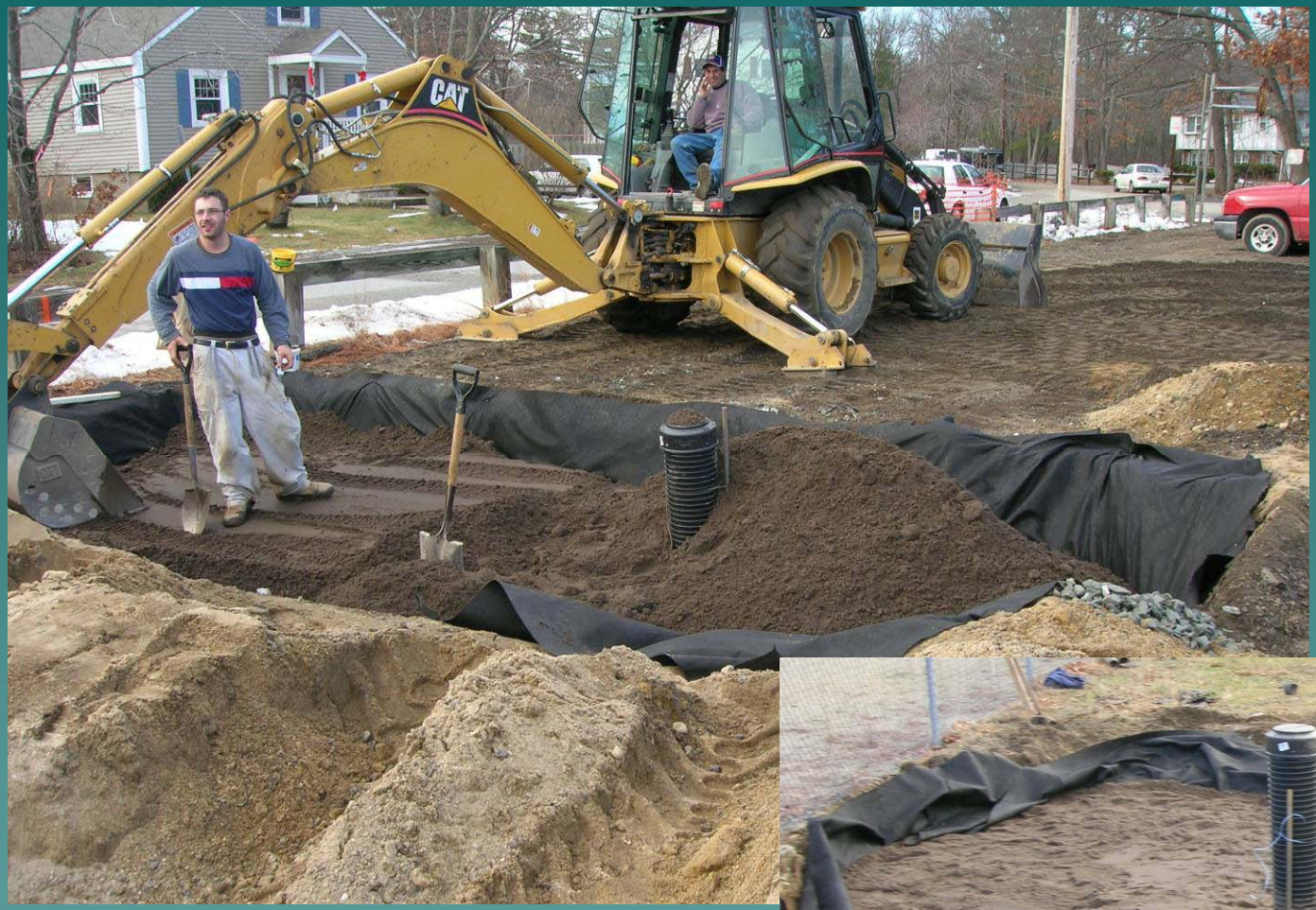
Area #3: Parking Lot Improvements (cont.)

GravelPave2 ™ System

Area #3: Parking Lot Improvements (cont.)

Bioretention center islands and perimeter bioretention cells.

Area #3: Parking Lot Improvements (cont.)



(above) Bioretention Cell under construction; (right) Installed Bioretention Cell

Area #3: Parking Lot Improvements (cont.)

Rock Infiltration bed under construction

Area #3: Parking Lot Improvements (cont.)

Rock Infiltration bed under construction

Bioretention cells under construction

Area #4 Dexter St. and Silver Lake Ave. Improvements

UNI-Ecostone Porous Pavers

Raingardens

Outlet Restoration Area

Area #4 Dexter St. and Silver Lake Ave. Improvements

Catch basin location on Dexter Street.

Rain Gardens located in private lots.

Area #4 Dexter St. and Silver Lake Ave. Improvements (cont)

Rain Gardens in private lots designed by GeoSyntec for a project in Littleton, MA.

Area #4 Dexter St. and Silver Lake Ave. Improvements (cont.)

www.barr.com

Area #4 Dexter St. and Silver Lake Ave. Improvements (cont.)

Rain Garden Maintenance

- Properly designed and installed Rain Gardens some annual maintenance.
  - While vegetation is being established, pruning and weeding may be required. Weeds should be removed thereafter by hand.
  - Detritus may need to be removed approximately twice per year. Perennial plantings may be cut at the end of the growing season.
  - Mulch should be replaced when erosion is evident. Mulch should be replenished annually. Once every 2-3 years the entire area may require mulch replacement (Mulch provided by Town Recycle Center).
  - During periods of extended drought, Rain Gardens may require watering.
  - Rain Gardens should not be mowed on a regular basis.

Area #4 Dexter St. and Silver Lake Ave. Improvements (cont.)

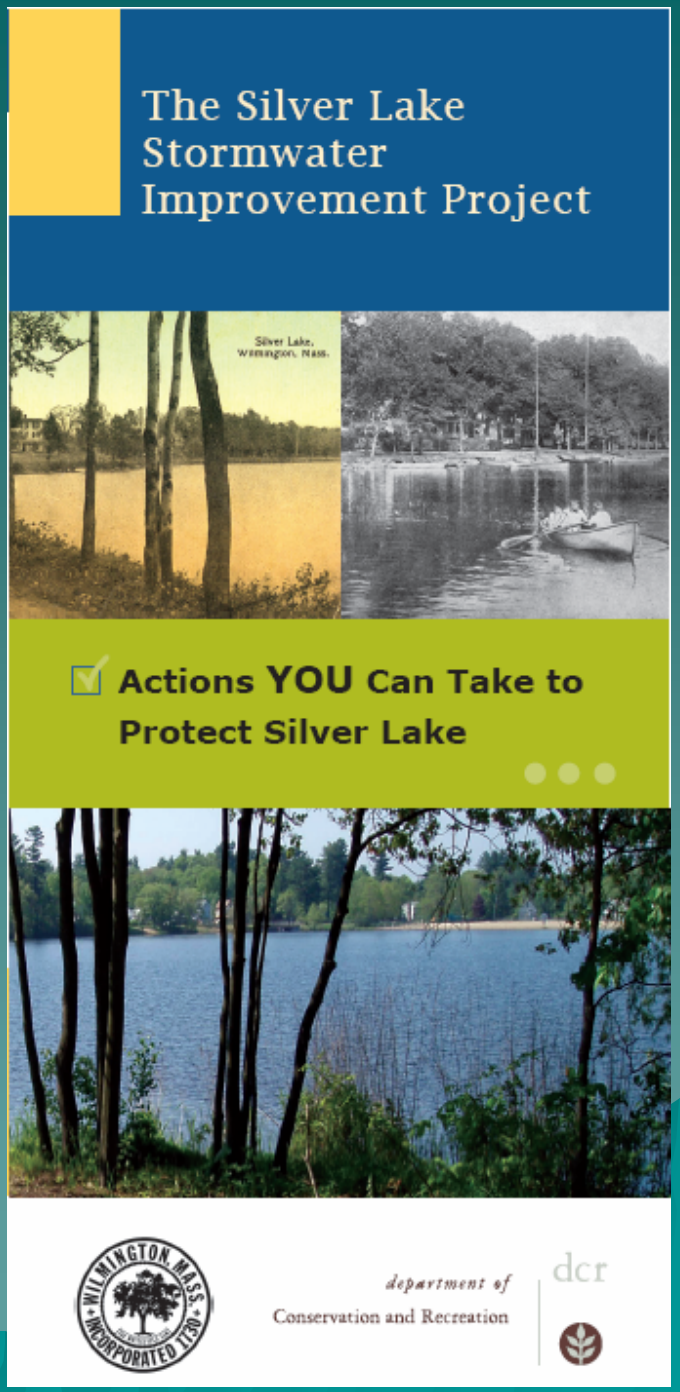
Compacted street side dirt parking area (12 Silver Lake Ave.)

Porous Pavers

Area #5 Drainage Outlet from Silver Lake Ave

Other Silver Lake Management Issues:

- Public Education/Outreach
- Total construction budget
- $350k



Questions…

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